TOYOTA

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October 23, 2007

Mr. Harry Thompson
Chief, Crash Avoidance Division (NVS-221)
Office of Vehicle Safety Compliance, Room W43-481
National Highway Traffic Safety Administration
1200 New Jersey Ave, S.E.
Washington, D.C. 20590

Re: NVS-221SSe/OA-124-070921

Dear Mr. Thompson:

On behalf of Toyota Motor Corporation (TMC), I am submitting the enclosed information in response to your September 26, 2007 letter [NVS-221SSe/OA-124-070921] regarding FMVSS 124 compliance testing of the 2007 MY Toyota Tacoma.

Should you have any questions about this information, please contact Mr. Chris Santucci at (202) 775-1707.

Sincerely,

Chris Tinto
Vice President
TOYOTA MOTOR NORTH AMERICA, INC.

CT:cs
Enclosure

TOYOTA'S RESPONSE TO
NHTSA'S REQUEST ON FMVSS No. 124 FOR
THE 2007 TOYOTA TACOMA
(NVS-221SSe/OA-124-070921)

1. The number of MY 2007 Tacoma Pickups sold in the U.S. market to the date of this letter, broken down by engine type (4 or 6 cylinders), transmission (Manual or Automatic), and drive (2 or 4 wheel drive).

Response 1.
The number of the vehicles sold in the U.S. market is set forth in Table 1 below:

Engine type	Drive type	Transmission				Total
		Manual		Automatic		
		5-speed	6-speed	4-speed	5-speed	
2TR-FE (4 cylinder)	2WD	11,255	0	29,423	0	165,822
	4WD	8,101	0	0	0	
1GR-FE (6 cylinder)	2WD	0	2,712	0	56,640	
	4WD	0	9,090	0	48,601	

Table 1

2. A copy of the test reports and any other data used to certify each of the vehicles identified in item no. 1 to FMVSS 124. It is important that data traces for measured outputs versus time be included.

Response 2.
The summary reports are provided as Attachments 1-1 through 1-4.

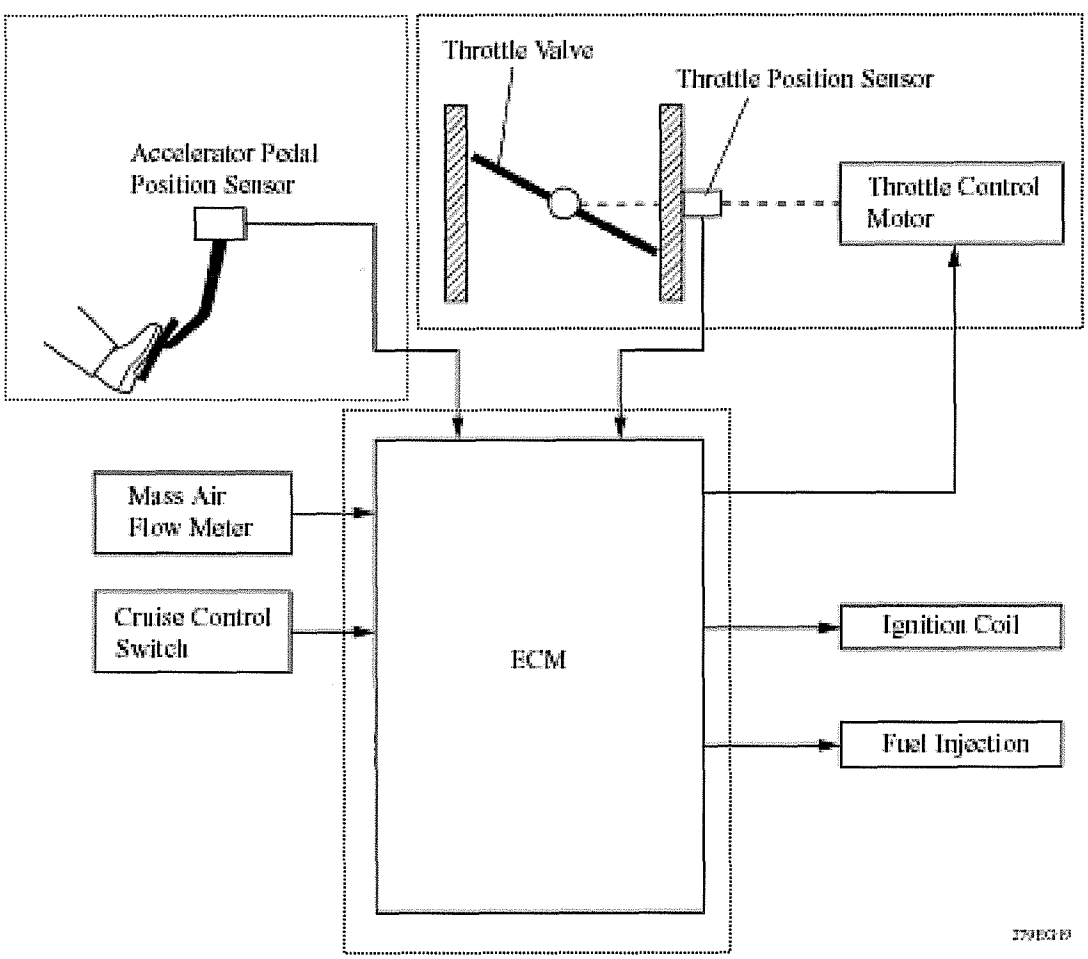
3. Please complete the enclosed standardized vehicle information/test specifications FORM 12.

Response 3.
The requested FORM 12 is provided as Attachment 2

Test data for FMVSS No.124 Compliance Test
Vehicle Model: 2007 Toyota Tacoma

In the case of the Toyota Tacoma, no cable is connected between the accelerator pedal and the throttle valve because the throttle valve of the engine is controlled electrically by the electric throttle control system. Therefore, Toyota assures that the Tacoma vehicles conform to FMVSS124 by conducting compliance confirmation tests (refer to Table 1), which are necessary for each component shown in Figure 1.

Figure 1: Electronic Throttle Control System



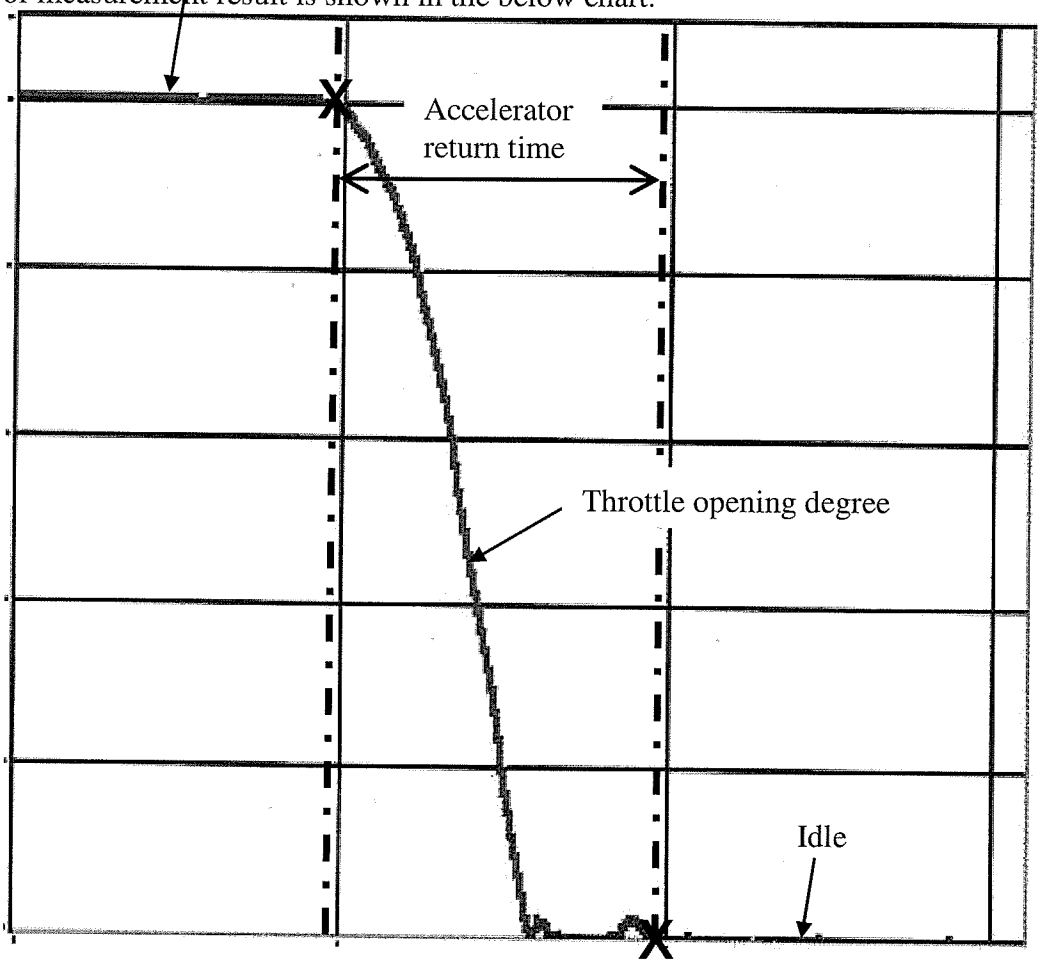
The compliance confirmation result for each component is submitted as Attachments 1-2 through 1-4. In addition, a summary of the confirmation for each component is shown in Table 1.

Table 1: Contents of confirmation for each component

Components	Contents of confirmation	Attachment #
Accelerator Pedal	It is confirmed that the accelerator pedal returns to the idle position when either one of the two return springs doesn't function. (Return time is confirmed by the Accelerator Pedal Position Sensor signal.)	Attachment 1-2
Throttle Body Assembly w/motor	It is confirmed that the throttle valve returns to the idle position when a return spring doesn't function or the signal to throttle control motor is interrupted. (Return time is confirmed by the Throttle Position Sensor signal.)	Attachment 1-3
ECM	When the accelerator pedal is returned to the rest or "idle" position, an electric motor ensures the throttle valve returns to the equivalent of an engine idle condition. If an electrical problem occurs in the control system, it is confirmed that the Engine Control Module (ECM) returns the throttle valve to the equivalent of an engine idle condition.	Attachment 1-4

How to measure accelerator return time

The return time is the time that the throttle valve closes from the wide open throttle to the idle position. The throttle opening degree is measured by detecting output-signal from Throttle Position Sensor. Example of measurement result is shown in the below chart.



Example of measurement result

Attachment 1-2

Technical Report Summary

Report No. : R0408-0100
Report Date: August 3, 2004

Title : Accelerator control systems test of 2007 model Tacoma
Sub-title : Compliance testing for FMVSS 124

1. Purpose : The purpose of this test is to investigate conformity of the 2003 model GX470 to FMVSS 124.

2. Conclusion : The 2003 model GX470 conforms to the performance requirements of FMVSS 124.

3. Test results (Summary):
   (1) Test conditions
      (a) Test date : August 1, 2002
      (b) Test part : Pedal, Module Accelerator (78120-60350)

   (2) Test result
   Return time*1 m sec

Return spring condition / Pedal release operation	Low temperature test (temp: -40 °C)		Normal temperature test (temp: 25 °C)		Pass or Fail
	Normal	Abnormal*2	Normal	Abnormal*2	
Inner spring disconnected	96	70	85	70	Pass
Outer spring disconnected	90	90	97	88	Pass

*1: The return time was measured by detecting the output-signal from the Accelerator Position Sensor.
*2: The operator releases the accelerator pedal by sliding his foot to the side from the W.O.T. position.

Comment : The 2007 model Tacoma can be carried over from the 2003 model GX470 for accelerator control performance.

Technical Report Summary

Report No. : R0505-0753
Report Date: May 26, 2005

Title : Accelerator control systems test of CCC21 type throttle body
Sub-title : Compliance testing for FMVSS 124

1. Purpose : The purpose of this test is to investigate conformity of the throttle body (CCC21 type) to FMVSS 124.

2. Conclusion : The applicable throttle body conforms to the performance requirements of FMVSS 124.

3. Test results (Summary) :

(1) Test conditions

(a) Test date : April, 2003

(b) Test part : 22030-31010 (BODY ASSY, THROTTLE W/MOTOR) CCC21 type

(2) Test result

Return time*1 m sec

Throttle body condition	Low temperature test (temp: -40°C)	Normal temperature test (temp: 25°C)	Pass or Fail
Shut down current to throttle control motor *2	620	196	Pass
Throttle return spring disconnected	131	184	Pass

*1: The return time was measured by detecting the output-signal from the Throttle Position Sensor.

*2: The return time was measured when the current to the throttle control motor was shut down.

Comment : The structure of the 2007 model Tacoma throttle body is the same as the CCC21 type.

Technical Report Summary

Title : ECM (Engine Control Module) test
Sub-title : Compliance testing for FMVSS 124

1. Purpose : The purpose of this test is to investigate conformity of the 2005 model Prius to FMVSS 124

2. Conclusion : The 2005 model Prius conforms to the performance requirements of FMVSS 124

3. Test results (Summary):
   (1) Test conditions
      (a) Test date : April 12 and 13, 2004
      (b) Test part : Computer, Engine Control (89661-47100)

   (2) Test result

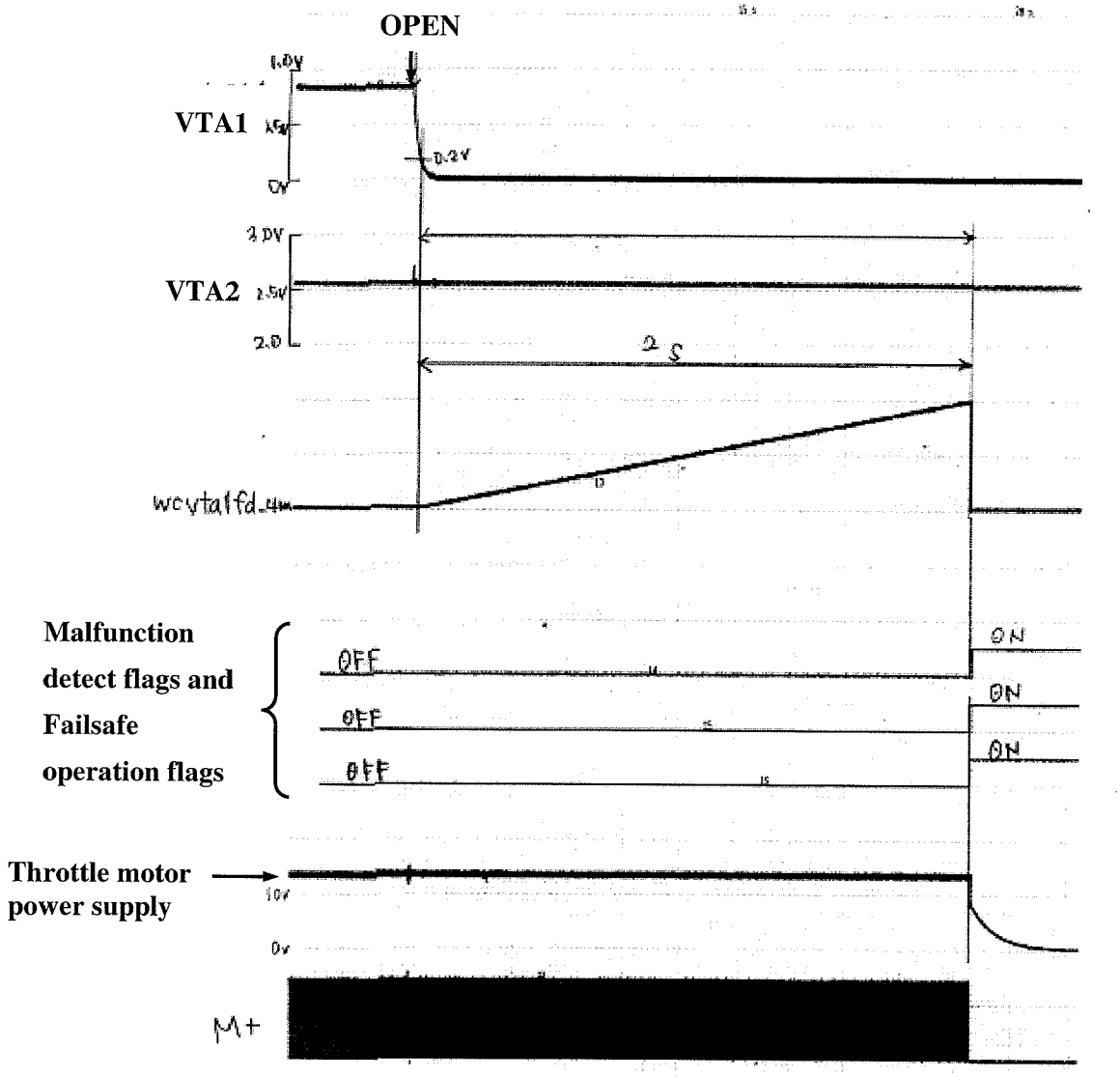
Failure Mode	Fail-safe Condition	Pass or Fail
Throttle position sensor circuit open	Shut down the power supply of throttle control motor	Pass
ECM internal circuit open	Shut down the output of Throttle control motor	Pass

Comment : Part of the fail-safe operation charts of is attached to the next page for your reference.

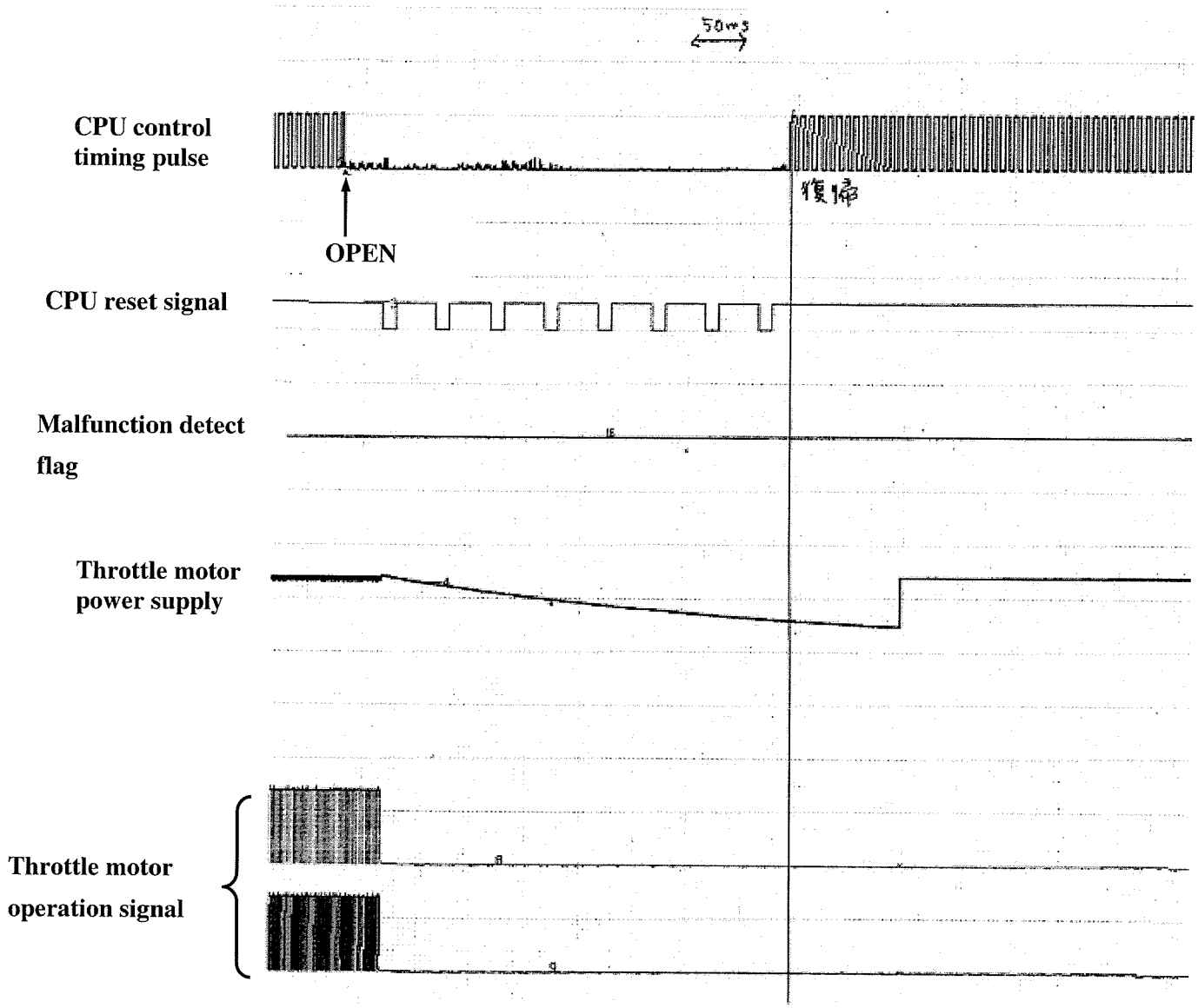
The 2007 model Tacoma can be carried over from the 2005 model Prius for accelerator control performance.

Fail-safe operation timing chart

VTA1 Throttle Position Sensor Circuit Open



Fail-safe operation timing chart
ECM Internal Circuit Open



VEHICLE INFORMATION/TEST SPECIFICATIONS
FMVSS 124 - Accelerator Control Systems

Requested Information:

1.) A sketch of the driver operated accelerator control system (ACS) starting from the accelerator pedal up to and including the fuel metering device (carburetor, fuel injectors, fuel distributor, or fuel injection pump).

Response 1.

The 2007 Toyota Tacoma has four ACSs: ACS with 2TR-FE engine and cruise control, ACS with 2TR-FE engine without cruise control, ACS with 1GR-FE engine and cruise control and ACS with 1GR-FE engine without cruise control. The driver operated ACS consists of the accelerator pedal, throttle body and cruise control. If the engine is the same, the accelerator pedal and the throttle body for ACS with cruise control and ACS without cruise control are the same. The sketches of the ACS are provided as Attachment 3. In addition, a sketch of the fuel system is provided as Attachment 4.

2.) For Normal ACS operation, the method utilized to determine the engine idle state (air throttle plate position, fuel delivery rate, other).

Response 2.

For Normal ACS operation, the method utilized to determine the engine idle state is the Throttle Valve Position. A sketch of the Throttle Valve is provided as drawing (B) in Attachment 5.

3.) For Fail-Safe operation of the ACS (disconnection or severance), the method utilized to determine return of engine power to the idle state (air throttle plate position, fuel delivery rate, air intake, engine rpm, other)

Response 3.

For Fail-Safe operation of the ACS (disconnection or severance), the method utilized to determine return of engine power to the idle state is the throttle body return spring and throttle control motor, shown as drawing (D) in Attachment 5.

4.) Is the vehicle ACS equipped with any of the following:
   A. Accelerator Pedal Position Sensor (APS)
   B. Throttle Plate Position Sensor (TPS)
   C. Electronic Control Module (ECM)
   D. Air throttle plate actuator motor

Response 4.
The 2007 Toyota Tacoma ACS is equipped with APS, TPS, ECM and Air throttle plate actuator motor, as shown in Attachment 5.

5.) If air throttle plate equipped, is there a procedure which can be utilized by the test laboratory to measure the position of the throttle plate by tapping into the TPS or ECM? If so, please describe.

Response 5.
The 2007 Toyota Tacoma is equipped with the air throttle plate. We normally call the air throttle plate "the throttle valve". A sketch of the air throttle plate (i.e.; throttle valve) is provided as drawing (B) in Attachment 5. The procedure that can be utilized by the test laboratory to measure the position of the throttle plate (i.e.; throttle valve) by tapping into the ECM is provided as Attachment 6.

6.) Point(s) chosen to demonstrate compliance with FMVSS 124 for single point disconnect and severance.

Response 6.
We choose 4 points (i.e.; two accelerator pedal springs, one throttle body return spring and one throttle control motor) to demonstrate compliance with FMVSS 124. The procedure for removing the accelerator pedal spring is provided as Attachment 7-1. The spring inside the electrical throttle body and throttle control motor are not possible to cut or remove, as shown in Attachment 7-2.

7.) Where applicable, were connections in the ACS beyond the ECM such as the fuel injectors tested for disconnection and severance. If yes, provide details.

Response 7.
The connections in the ACS beyond the ECM such as the fuel injectors weren't tested for disconnection and severance.

8.) Where applicable, were idle return times tested for electrical severance accompanied by shorting to ground? If yes, please provide details.

Response 8.
The idle return times weren't tested for electrical severance accompanied by shorting to ground.

9.) All sources of return energy (springs) for the accelerator pedal and if applicable, the air throttle plate.

Response 9.
The 2007 Toyota Tacoma has 2 sources of energy (i.e.; two accelerator pedal springs, throttle body return spring and throttle control motor) capable of returning the throttle to the idle. Details on the energy sources are provided as Attachment 8.

10.) If fuel delivery rate is used to demonstrate return to idle state, provide:
A. The method used to measure this signal i.e. connection to standard SAE J1587 data bus.
B. Equipment required to measure signal.
C. Fuel rate signal output range at the idle state.

Response 10.
The fuel delivery rate isn't used to demonstrate return to idle state.

11.) Is the ACS equipped with a limp home mode? If yes, provide operation description.

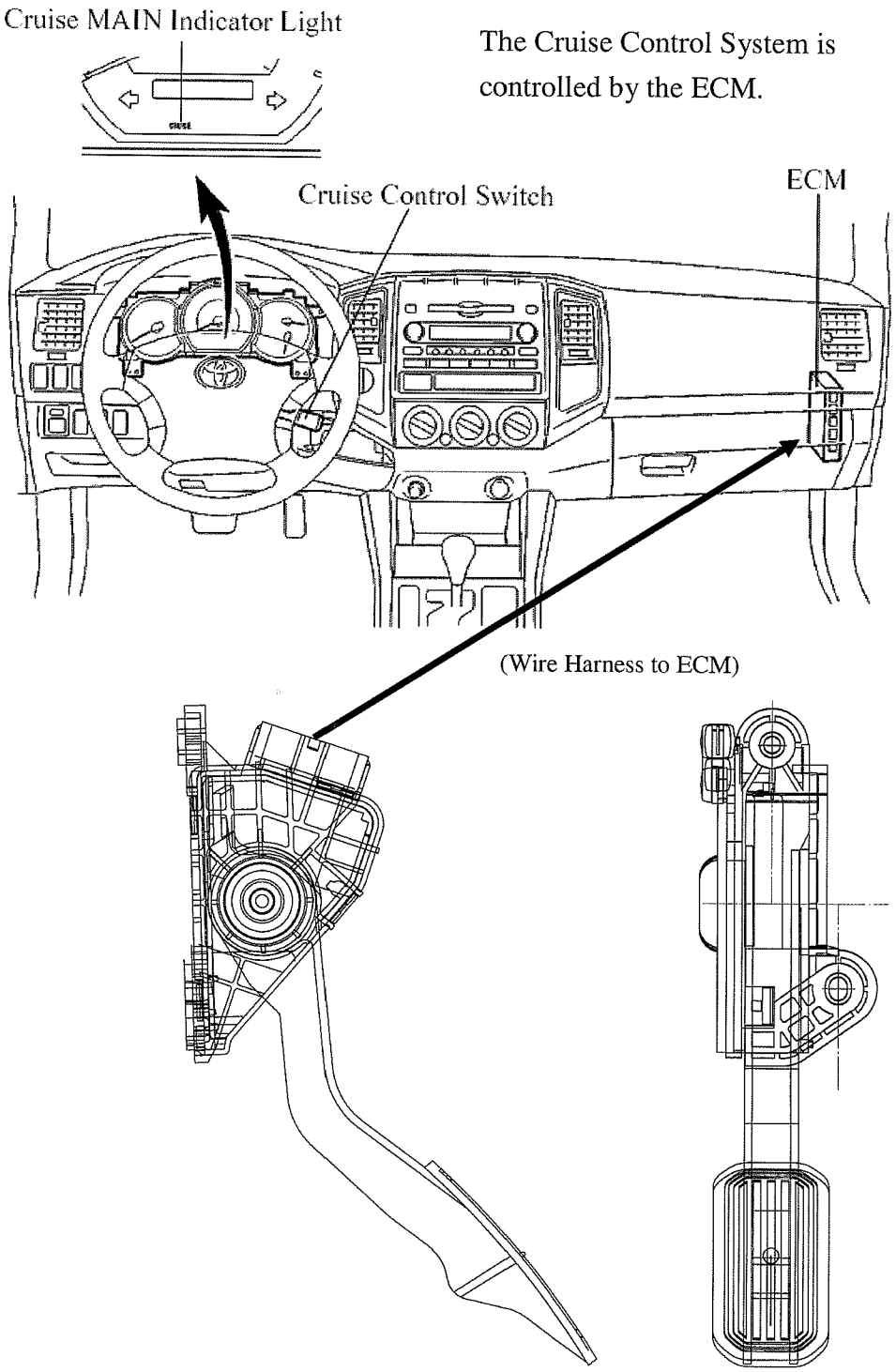
Response 11.
Yes, the ACS is equipped with a limp home mode, as shown in Attachment 9.

12.) Method by which the test laboratory can record engine RPM by connection to ECM, OBD connector, etc.

Response 12.
The method for recording engine RPM is provided as Attachment 10.

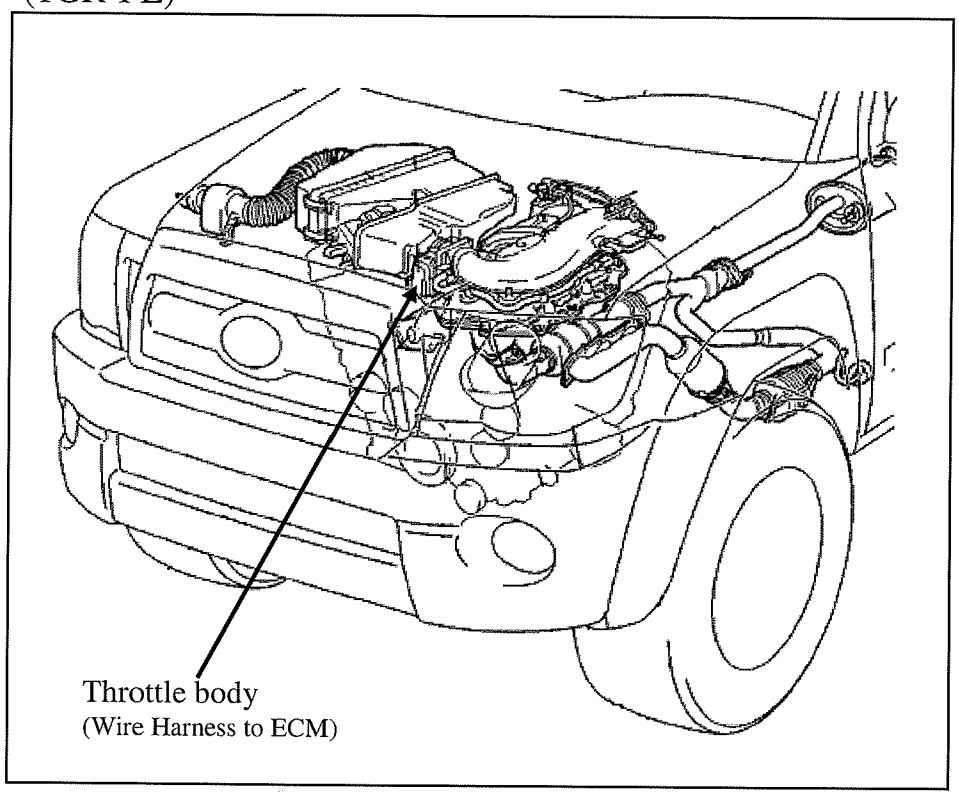
Accelerator Control System

<Accelerator pedal>

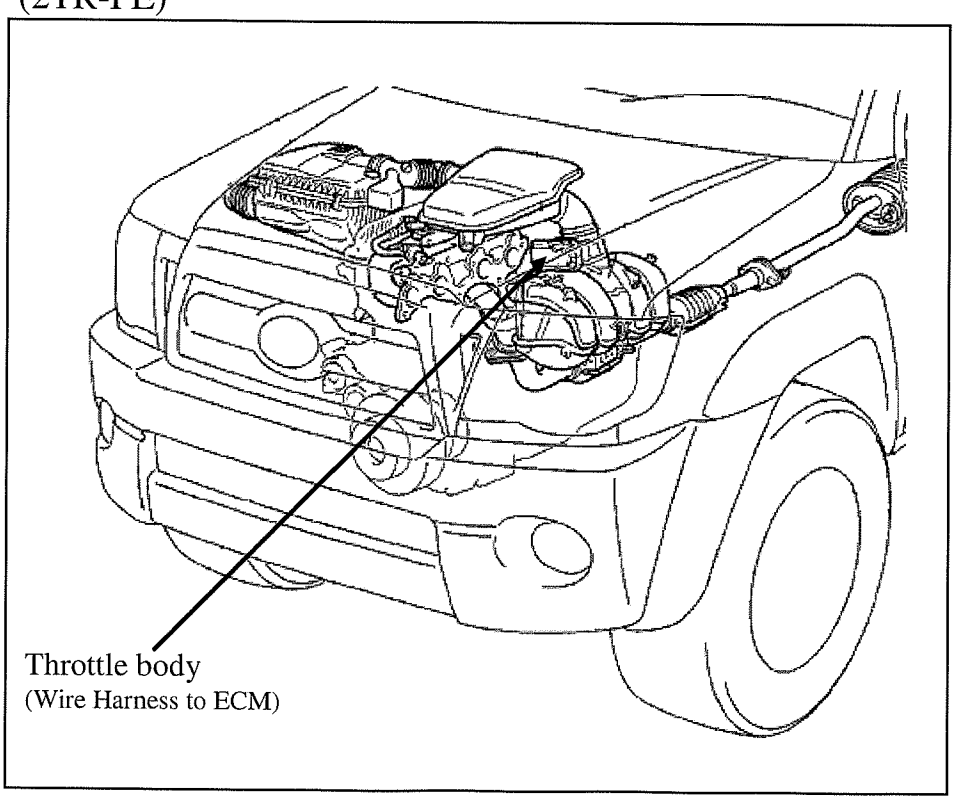


<Throttle Body>

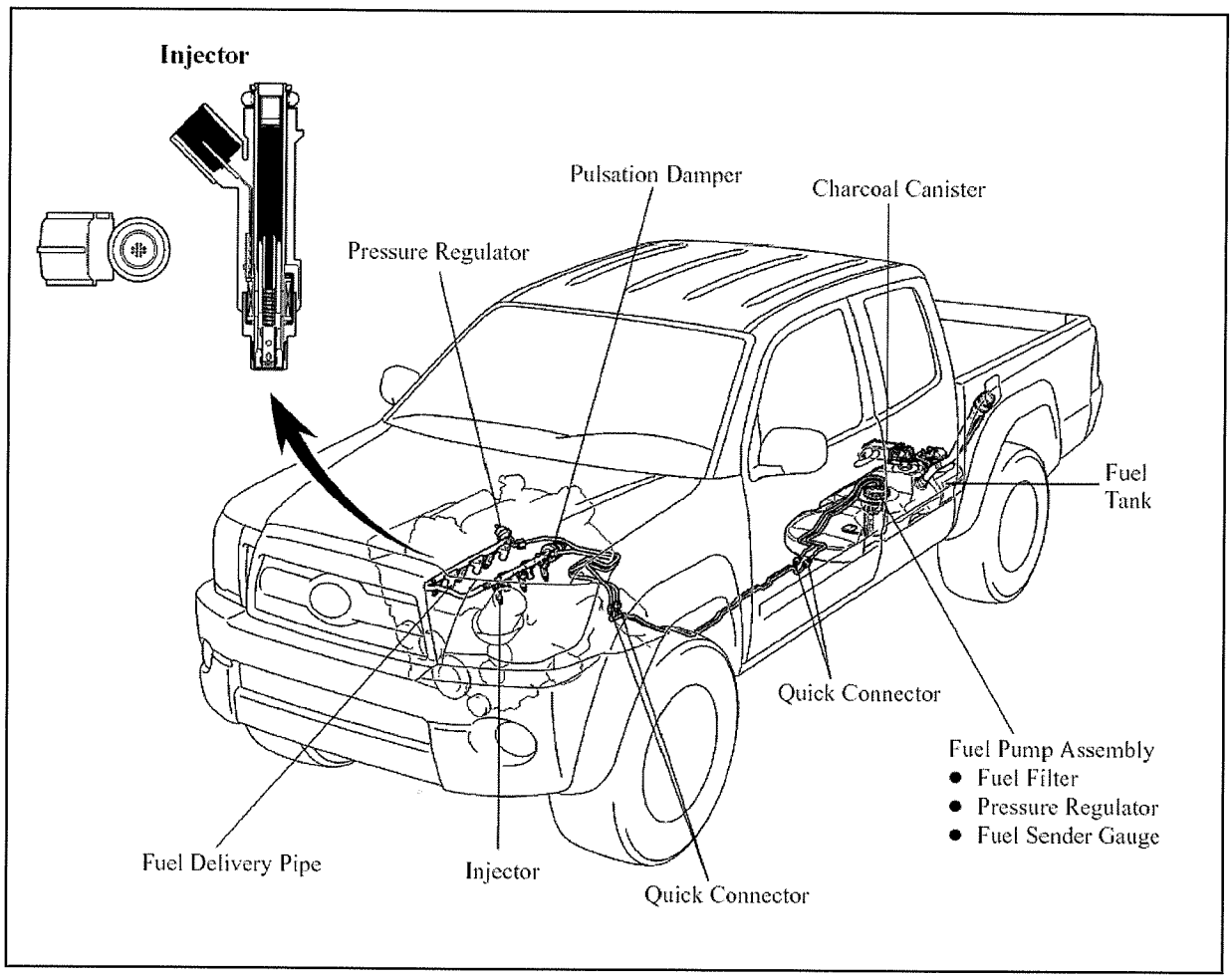
(1GR-FE)



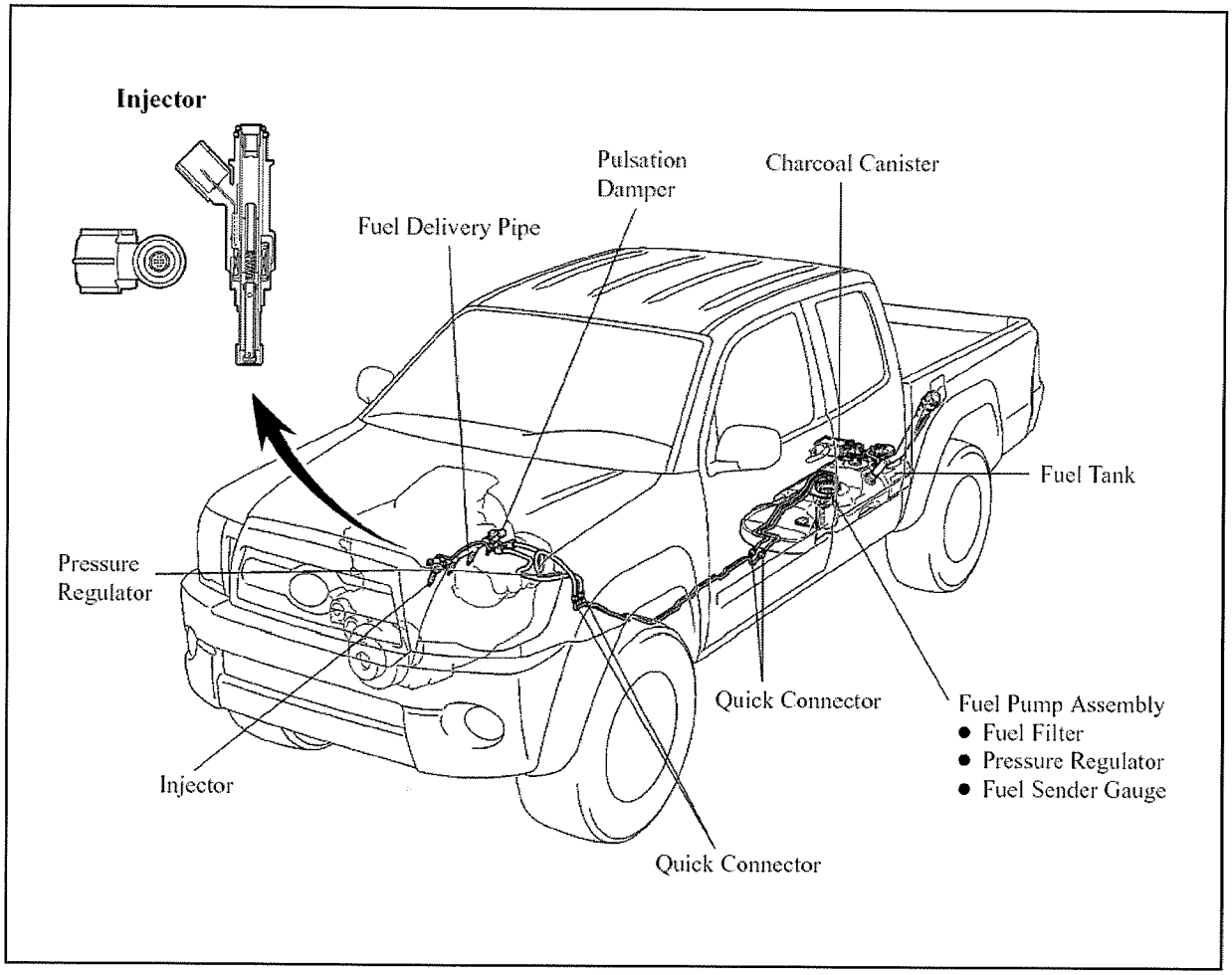
(2TR-FE)



Fuel system for the 2007MY Tacoma (1GR-FE)

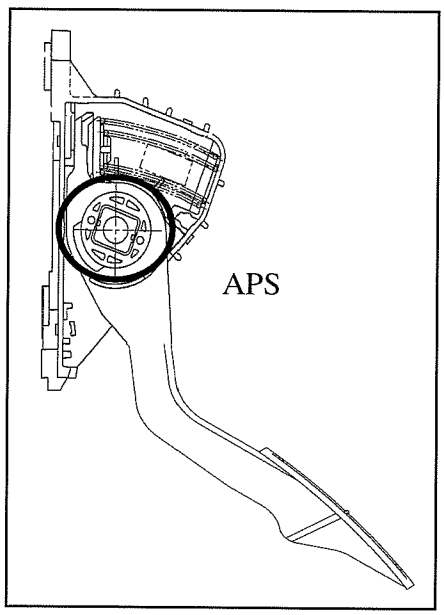


Fuel system for the 2007MY Tacoma (2TR-FE)



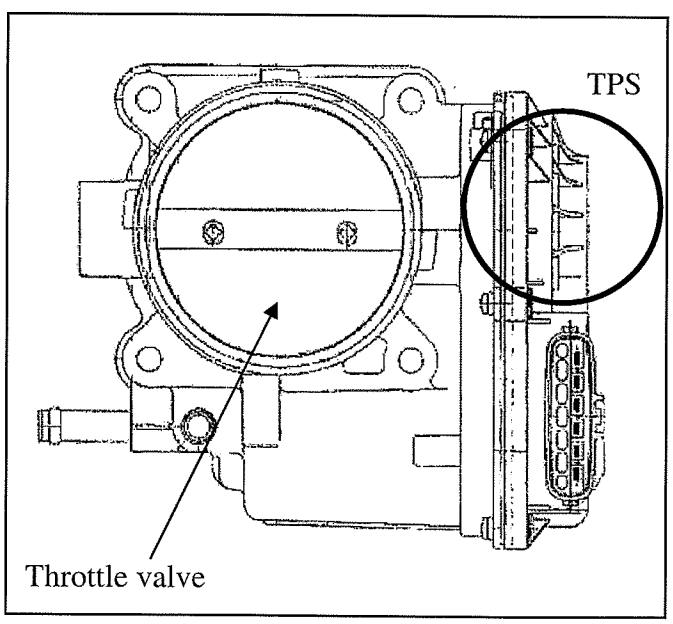
Components of the Accelerator Pedal Position Sensor

(A) Accelerator Pedal Position Sensor (APS)

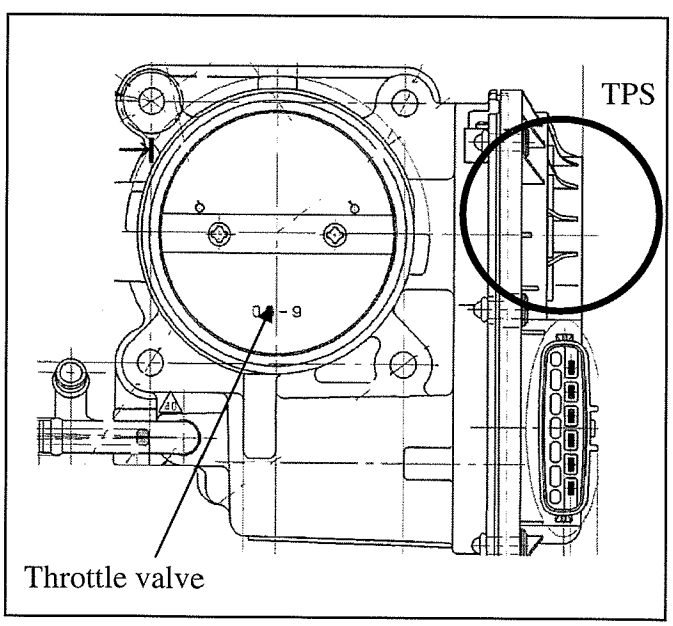


(B) Throttle Position Sensor (TPS)

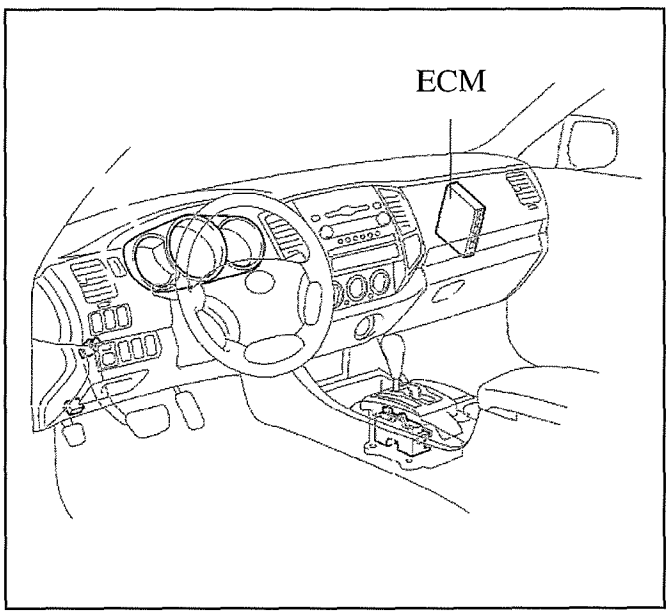
(1GR-FE)



(2TR-FE)

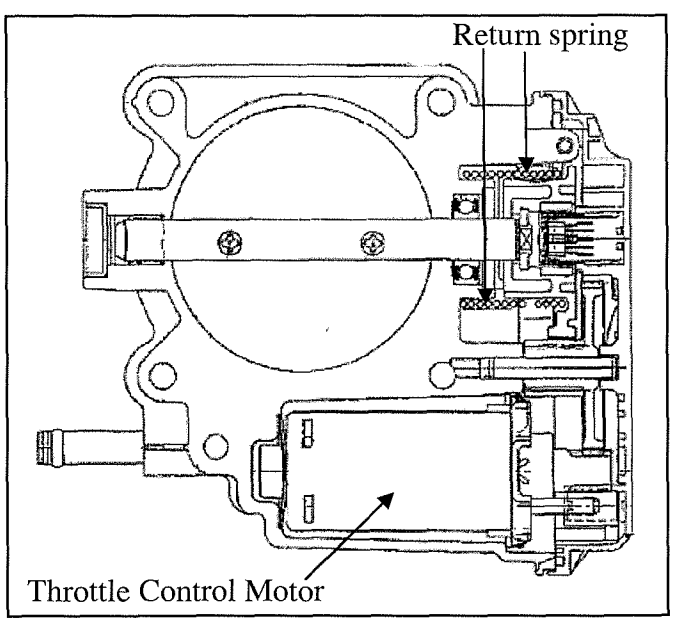


(C) Electronic Control Module (ECM)

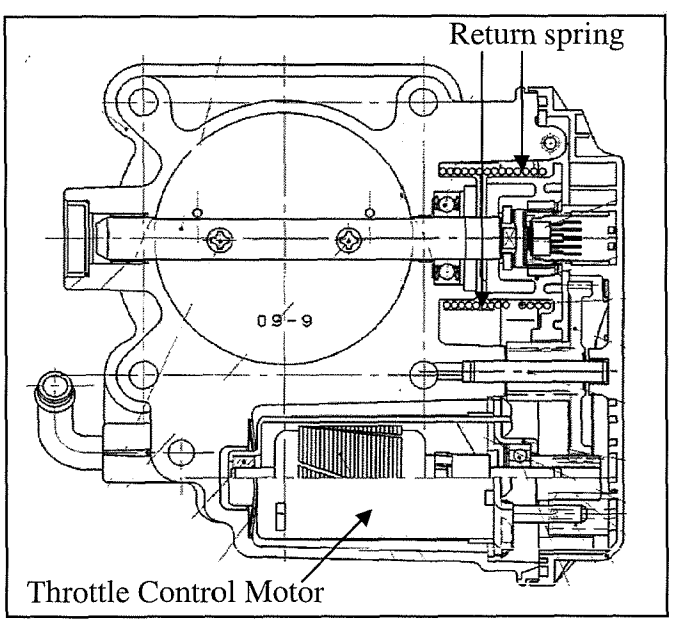


(D) Air throttle plate actuator motor (Throttle Control Motor)

(1GR-FE)



(2TR-FE)



How to measure the opening angle of the throttle valve (1GR-FE)

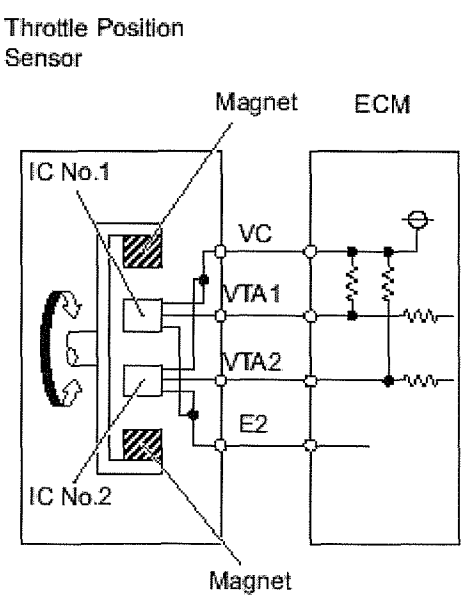
As for the method of detecting the signal, we are providing the related parts of the repair manual.

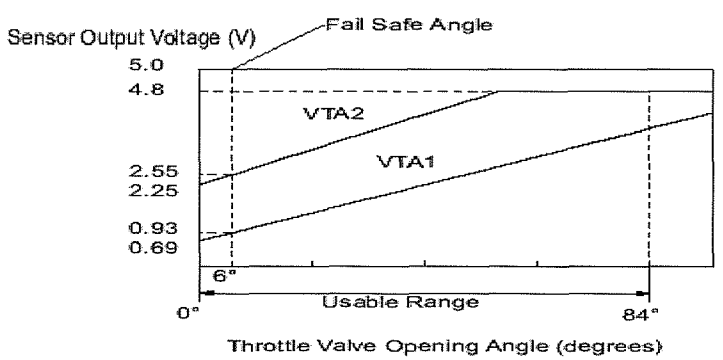
DTC	P0120	Throttle / Pedal Position Sensor / Switch "A" Circuit
DTC	P0122	Throttle / Pedal Position Sensor / Switch "A" Circuit Low Input
DTC	P0123	Throttle / Pedal Position Sensor / Switch "A" Circuit High Input
DTC	P0220	Throttle / Pedal Position Sensor / Switch "B" Circuit
DTC	P0222	Throttle / Pedal Position Sensor / Switch "B" Circuit Low Input
DTC	P0223	Throttle / Pedal Position Sensor / Switch "B" Circuit High Input
DTC	P2135	Throttle / Pedal Position Sensor / Switch "A" / "B" Voltage Correlation

HINT:
These DTCs relate to the Throttle Position (TP) sensor.

DESCRIPTION

This ETCS (Electronic Throttle Control System) does not use a throttle cable. The Throttle Position (TP) sensor is mounted on the throttle body, and detects the opening angle of the throttle valve. This sensor is a non-contact type, and uses Hall-effect elements, in order to yield accurate signals, even in extreme driving conditions, such as at high speeds as well as very low speeds.
The TP sensor has two sensor circuits which each transmits a signal, VTA1 and VTA2. VTA1 is used to detect the throttle valve angle and VTA2 is used to detect malfunctions in VTA1. The sensor signal voltages vary between 0 V and 5 V in proportion to the throttle valve opening angle, and are transmitted to the VTA terminals of the ECM.
As the valve closes, the sensor output voltage decreases and as the valve opens, the sensor output voltage increases. The ECM calculates the throttle valve opening angle according to these signals and controls the throttle actuator in response to driver inputs. These signals are also used in calculations such as air-fuel ratio correction, power increase correction and fuel-cut control.





Note:
The throttle Valve opening angle detected by the sensor terminal VTA1 is expressed as percentages.
Between 10 % and 24 %: Throttle valve fully closed
Between 66 % and 96 %: Throttle valve fully open
Approximately 19 %: Fail-safe angle (6°)

DTC No.	DTC Detection Conditions	Trouble Areas
P0120	Output voltage of VTA1 quickly fluctuates beyond lower and upper malfunction thresholds for 2 seconds (1 trip detection logic)	• Throttle Position (TP) sensor (built into throttle body) • ECM
P0122	Output voltage of VTA1 0.2 V or less for 2 seconds (1 trip detection logic)	• TP sensor (built into throttle body) • Short in VTA1 circuit • Open in VC circuit • ECM
P0123	Output voltage of VTA1 4.535 V or more for 2 seconds (1 trip detection logic)	• TP sensor (built into throttle body) • Open in VTA1 circuit • Open in E2 circuit • Short between VC and VTA1 circuits • ECM
P0220	Output voltage of VTA2 quickly fluctuates beyond lower and upper malfunction thresholds for 2 seconds (1 trip detection logic)	• TP sensor (built into throttle body) • ECM
P0222	Output voltage of VTA2 1.75 V or less for 2 seconds (1 trip detection logic)	• TP sensor (built into throttle body) • Short in VTA2 circuit • Open in VC circuit • ECM
P0223	Output voltage of VTA2 4.8 V or more, and VTA1 between 0.2 V and 2.02 V, for 2 seconds (1 trip detection logic)	• TP sensor (built into throttle body) • Open in VTA2 circuit • Open in E2 circuit • Short between VC and VTA2 circuits • ECM
P2135	Either condition (a) or (b) met (1 trip detection logic) (a) Difference between output voltages of VTA1 and VTA2 0.02 V or less for 0.5 seconds or more (b) Output voltage of VTA1 0.2 V or less, and VTA2 1.75 V or less, for 0.4 seconds or more	• Short between VTA1 and VTA2 circuits • TP sensor (built into throttle body) • ECM

HINT:

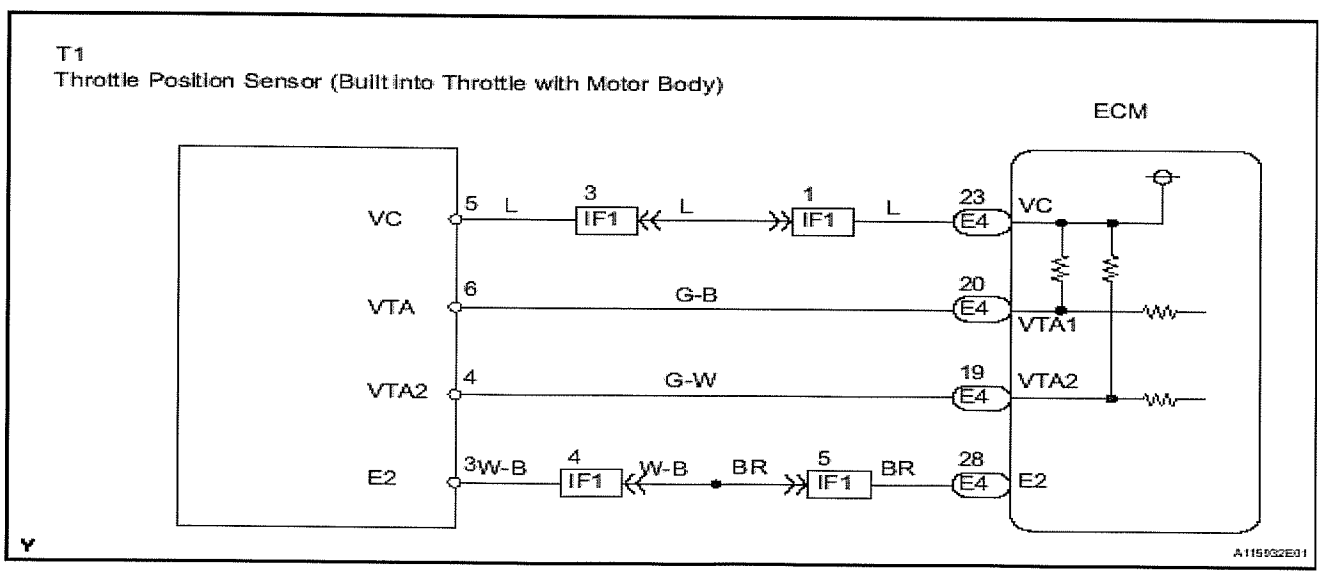
- When any of these DTCs are set, check the throttle valve opening angle by selecting the following menu items on an intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / THROTTLE POS AND THROTTLE POS #2.
- THROTTLE POS denotes the VTA1 signal (expressed in percentages), and THROTTLE POS #2 denotes the VTA2 signal (expressed in voltages).

Reference (Normal Condition)

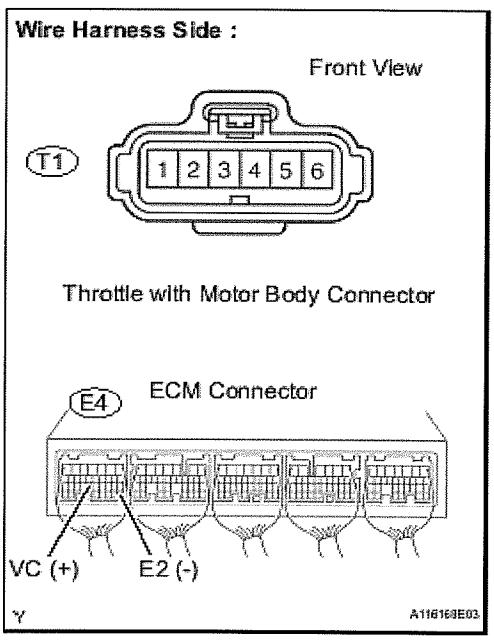
Tester Display	Accelerator Pedal Fully Released	Accelerator Pedal Fully Depressed
THROTTLE POS	10 to 24 %	64 to 96 %
THROTTLE POS #2	2.1 to 3.1 V	4.5 to 5.0 V

WIRING DIAGRAM

T1
Throttle Position Sensor (Built into Throttle with Motor Body)



3	INSPECT ECM (VC VOLTAGE)



(a) Disconnect the T1 throttle with motor body connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminals of the E4 ECM connector.

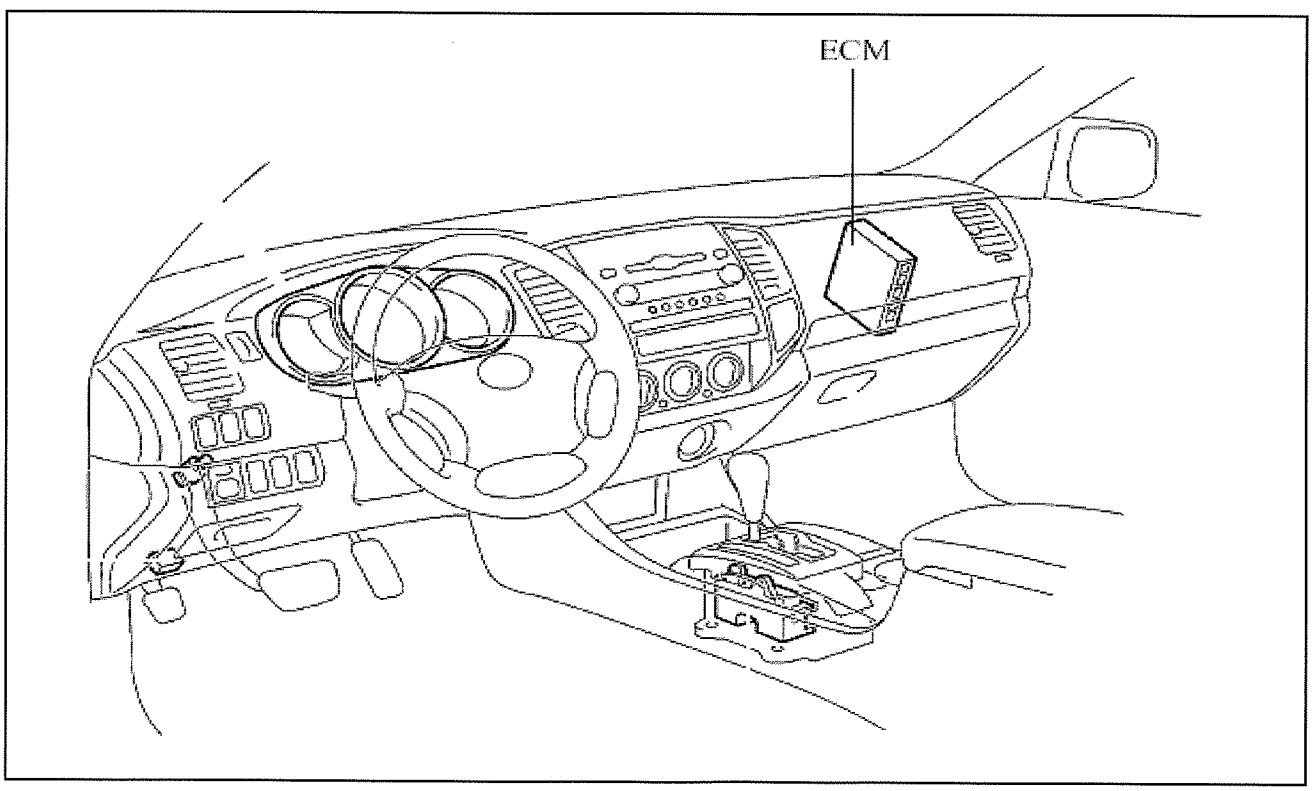
Standard Voltage

Tester Connections	Specified Conditions
VC (E4-23) - E2 (E4-28)	4.5 to 5.0 V

(d) Reconnect the throttle with motor body connector.

NG → **REPLACE ECM**

Layout of ECM



How to measure the opening angle of the throttle valve (2TR-FE)

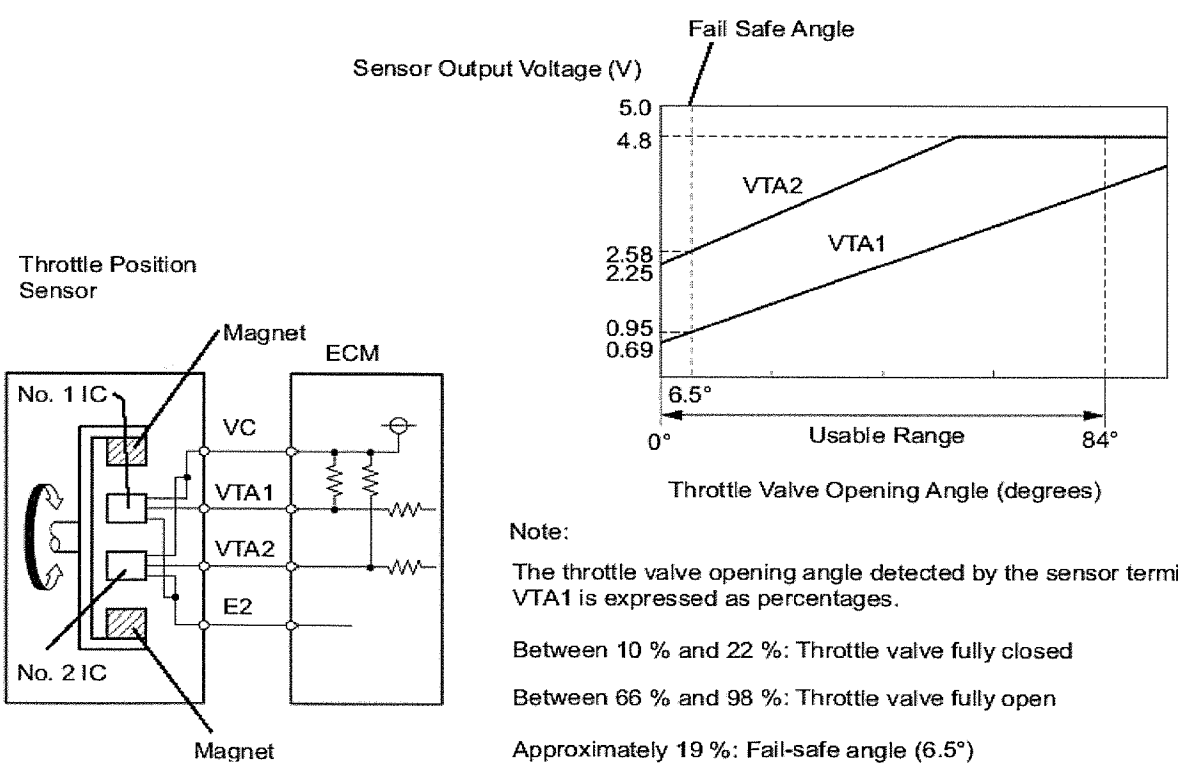
As for the method of detecting the signal, we provide the related parts of the repair manual.

DTC	P0120	Throttle / Pedal Position Sensor / Switch "A" Circuit
DTC	P0122	Throttle / Pedal Position Sensor / Switch "A" Circuit Low Input
DTC	P0123	Throttle / Pedal Position Sensor / Switch "A" Circuit High Input
DTC	P0220	Throttle / Pedal Position Sensor / Switch "B" Circuit
DTC	P0222	Throttle / Pedal Position Sensor / Switch "B" Circuit Low Input
DTC	P0223	Throttle / Pedal Position Sensor / Switch "B" Circuit High Input
DTC	P2135	Throttle / Pedal Position Sensor / Switch "A" / "B" Voltage Correlation

HINT:
These DTCs relate to the Throttle Position (TP) sensor.

DESCRIPTION

HINT:
The Throttle Position (TP) sensor is mounted on the throttle body, and detects the opening angle of the throttle valve. This sensor is a non-contact type, and uses Hall-effect elements, in order to yield accurate signals, even in extreme driving conditions, such as at high speeds as well as very low speeds. The TP sensor has two sensor circuits which each transmits a signal, VTA1 and VTA2. VTA1 is used to detect the throttle valve angle and VTA2 is used to detect malfunctions in VTA1. The sensor signal voltages vary between 0 V and 5 V in proportion to the throttle valve opening angle, and are transmitted to the VTA terminals of the ECM.
As the valve closes, the sensor output voltage decreases and as the valve opens, the sensor output voltage increases. The ECM calculates the throttle valve opening angle according to these signals and controls the throttle actuator in response to driver inputs. These signals are also used in calculations such as air-fuel ratio correction, power increase correction and fuel-cut control.



Note:

The throttle valve opening angle detected by the sensor terminal VTA1 is expressed as percentages.

Between 10 % and 22 %: Throttle valve fully closed

Between 66 % and 98 %: Throttle valve fully open

Approximately 19 %: Fail-safe angle (6.5°)

DTC No.	DTC Detection Condition	Trouble Area
P0120	Output voltage of VTA1 quickly fluctuates beyond lower and upper malfunction thresholds for 2 seconds (1 trip detection logic)	• Throttle position (TP) sensor (built into throttle body) • ECM
P0122	Output voltage of VTA1 0.2 V or less for 2 seconds (1 trip detection logic)	• Throttle position (TP) sensor (built into throttle body) • Short in VTA1 circuit • Open in VC circuit • ECM
P0123	Output voltage of VTA1 4.535 V or more for 2 seconds (1 trip detection logic)	• Throttle position (TP) sensor (built into throttle body) • Open in VTA1 circuit • Open in E2 circuit • Short between VC and VTA1 circuit • ECM
P0220	Output voltage of VTA2 quickly fluctuates beyond lower and upper malfunction thresholds for 2 seconds (1 trip detection logic)	• Throttle position (TP) sensor (built into throttle body) • ECM
P0222	Output voltage of VTA2 1.75 V or less for 2 seconds (1 trip detection logic)	• Throttle position (TP) sensor (built into throttle body) • Short in VTA2 circuit • Open in VC circuit • ECM
P0223	Output voltage of VTA2 4.8 V or more when VTA1 between 0.2 V and 2.02 V (1 trip detection logic)	• Throttle position sensor (built into throttle body) • Open in VTA2 circuit • Open in E2 circuit Short between VC and VTA2 circuit • ECM
P2135	Either condition (a) or (b) met (1 trip detection logic): (a) Difference between output voltages of VTA1 and VTA2 0.02 V or less for 0.5 seconds or more (b) Output voltage of VTA1 0.2 V or less, and VTA2 1.75 V or less, for 0.4 seconds or more	• Short between VTA1 and VTA2 circuit • Throttle position sensor (built into throttle body) • ECM

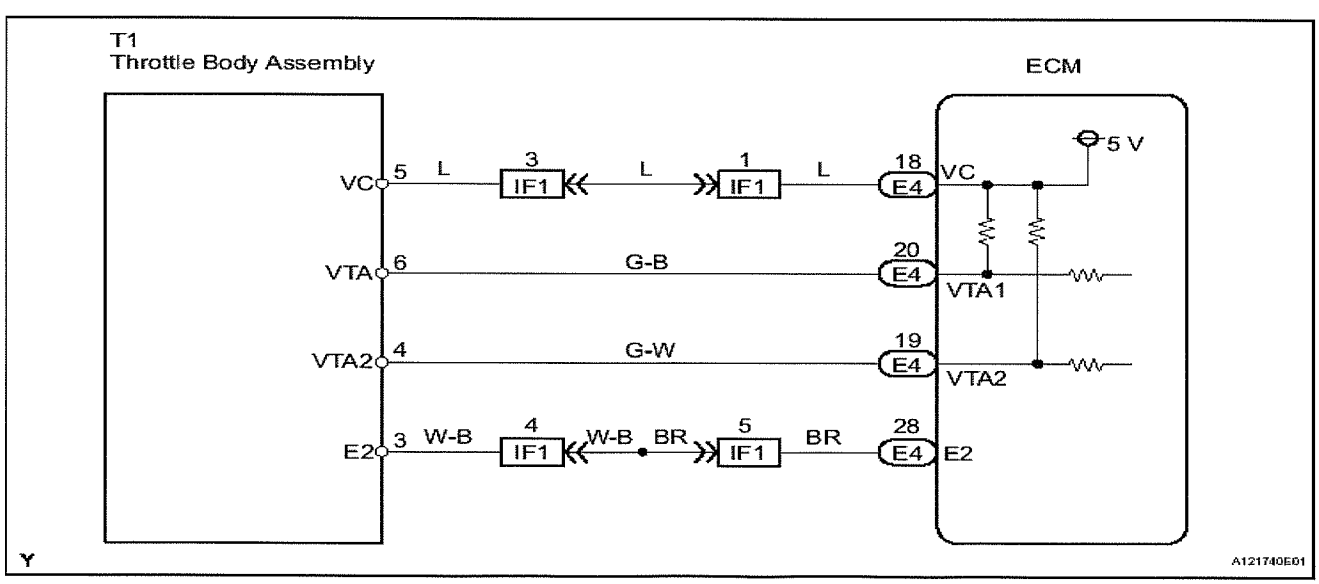
HINT:

- When any of these DTCs are set, check the throttle valve opening angle by selecting the following menu items on an intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / THROTTLE POS AND THROTTLE POS #2.
- THROTTLE POS denotes the VTA1 signal (expressed in percentages), and THROTTLE POS #2 denotes the VTA2 signal (expressed in voltages).

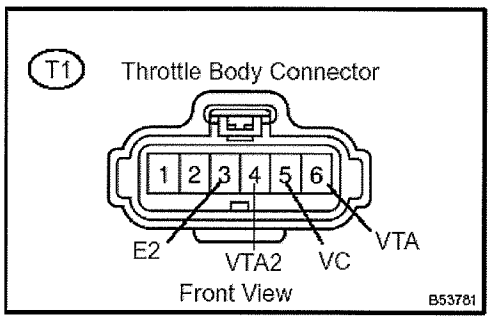
Reference (Normal condition):

Tester Display	Accelerator Pedal Fully Released	Accelerator Pedal Fully Depressed
THROTTLE POS	10 to 22%	66 to 99%
THROTTLE POS #2	2.1 to 3.1 V	4.5 to 5.0 V

WIRING DIAGRAM



3	INSPECT ECM(VC VOLTAGE)

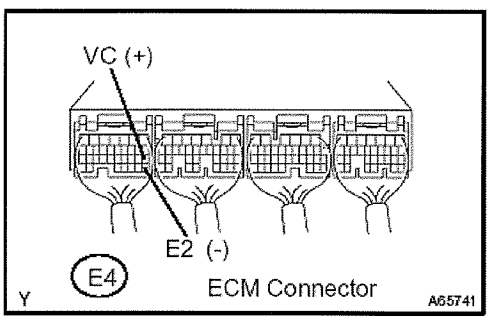


(a) Disconnect the T1 throttle body connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage between the terminals of the ECM connector.

Standard:

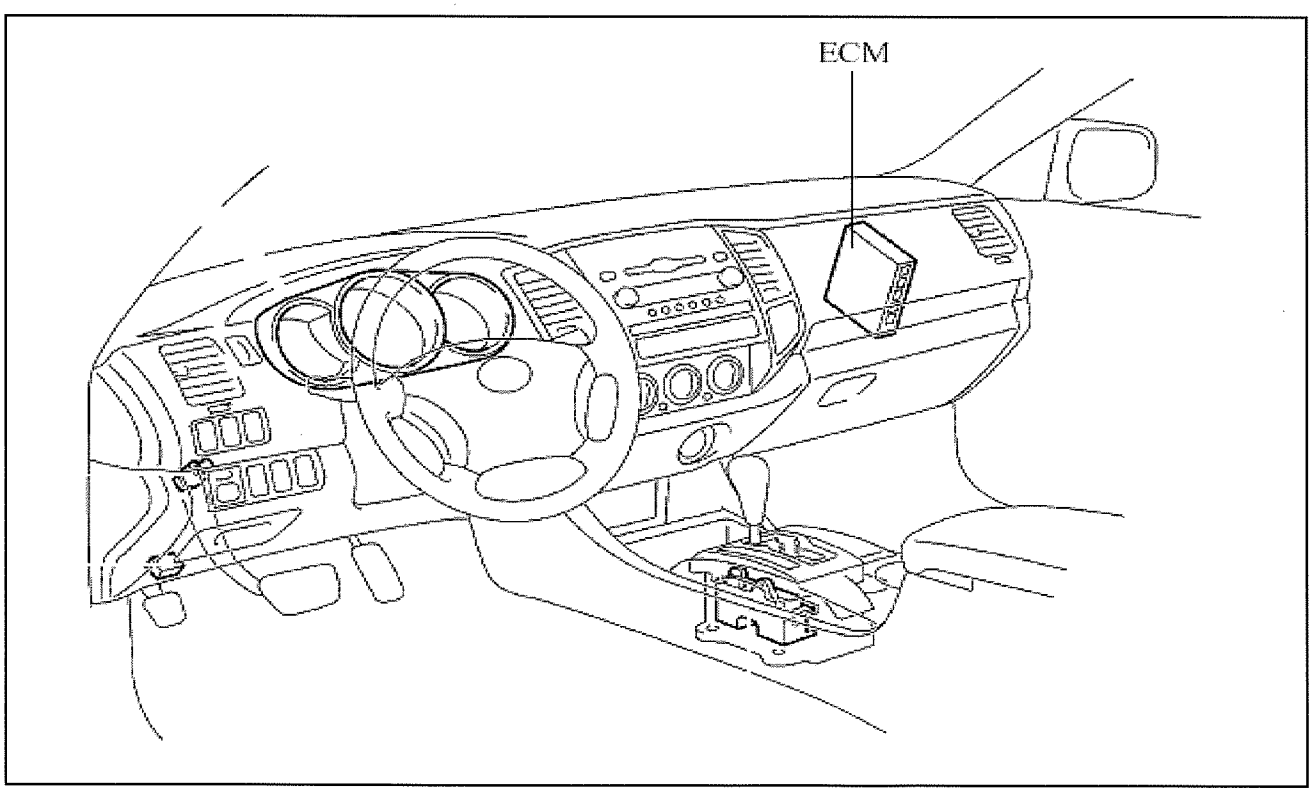
Tester Connections	Specified Conditions
VC (E4-18) - E2 (E4-28)	4.5 to 5.5 V

(d) Reconnect the throttle body connector.

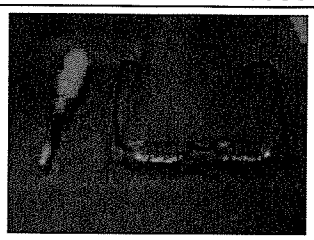
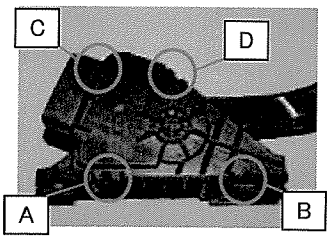
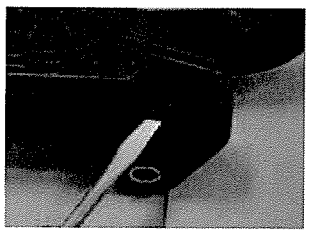
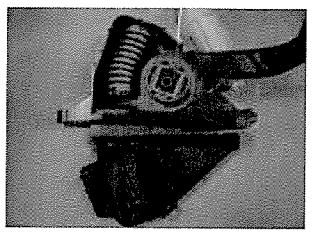
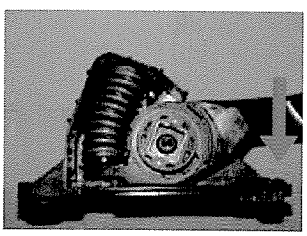
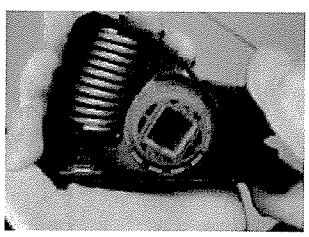
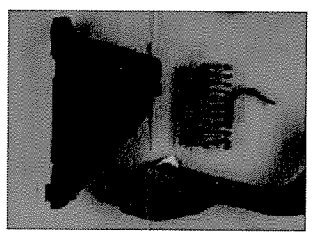
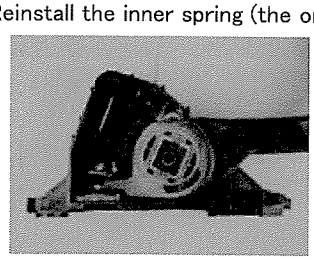
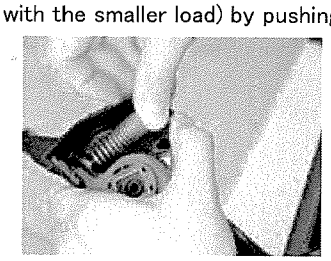
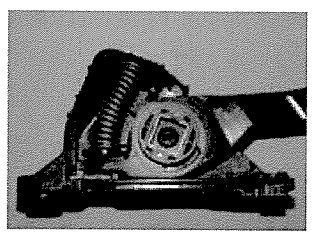
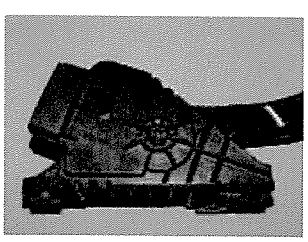
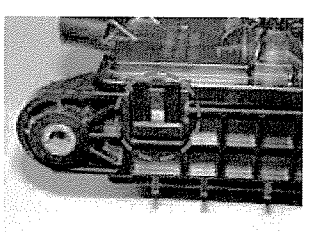


NG → **REPLACE ECM (See page 10-24)**

Layout of ECM



How to remove Accelerator Pedal Spring

No.	Process
1	Tools 1) Safety glasses 2)Straight slot screwdriver 
2	Using the screwdriver, unfit the snap-fit points A, B, C and D. Detach the sensor cover from the main body.   
3	Push the pedal in the direction represented by the arrow, and then remove the springs and the pedal. During the whole step, care should be taken to not touch the portion denoted by the dashed line.   
4	Reinstall the pedal on the shaft. Reinstall the inner spring (the one with the smaller load) by pushing it in.   
5	Reinstall the sensor cover. Verify that every snap-fit point (A, B, C and D) is firmly fitted. Carry out rewriting of the sensor software.  

Note: The reassembled parts are not included in the performance warranty.

How to remove the energy source of Throttle Body Assembly

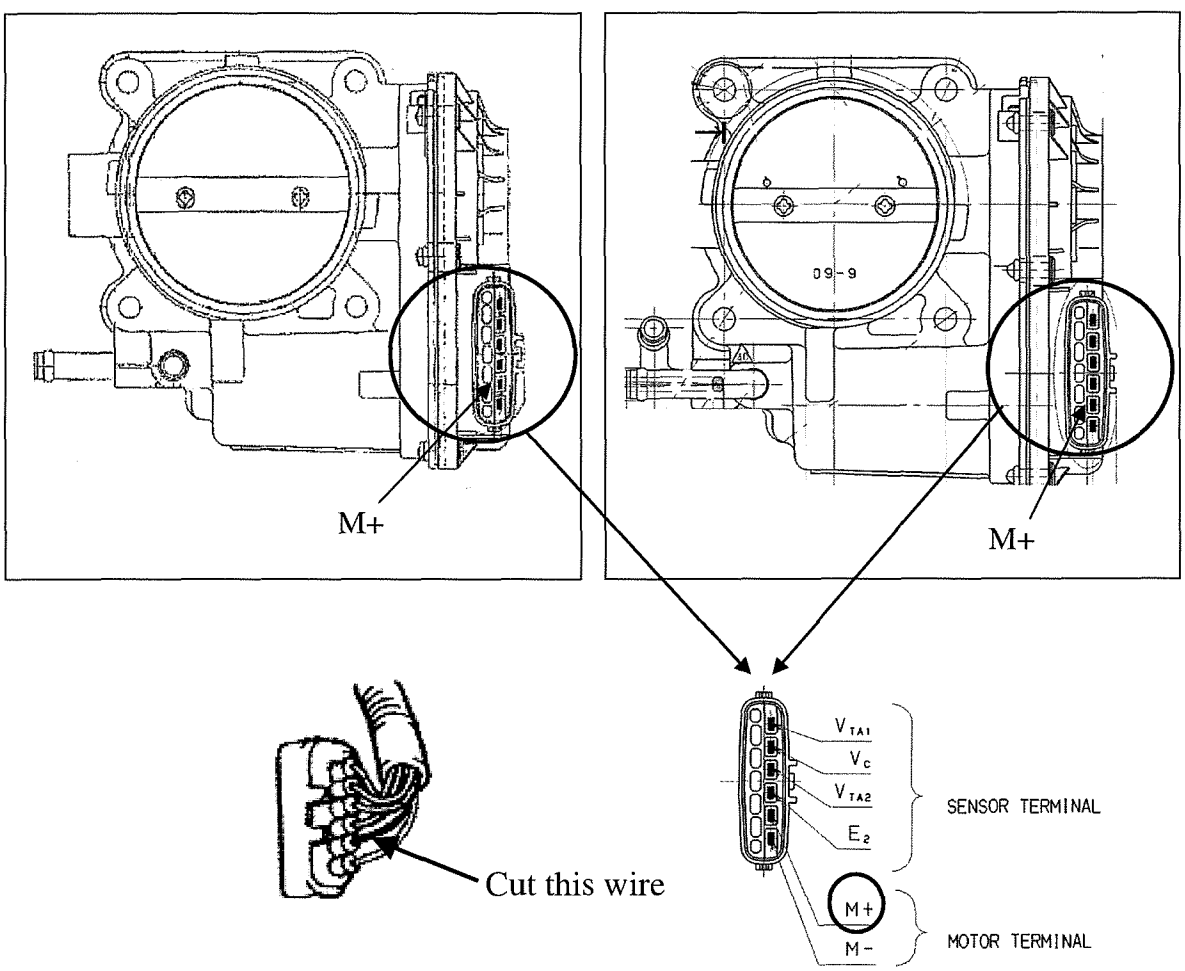
Energy source1 (Return spring):

The spring inside the throttle body is not possible to cut or remove.

Energy source2 (Throttle control motor):

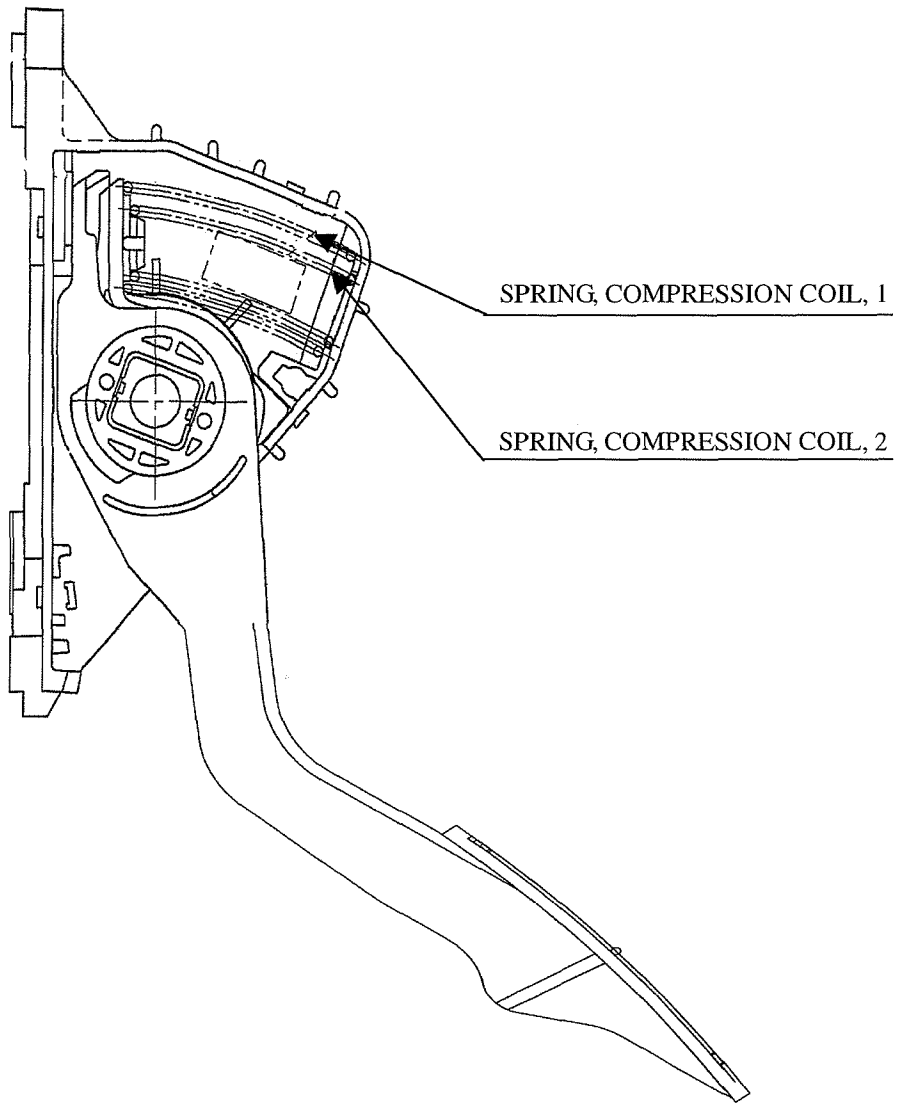
Cut the wire to M+ terminal. (See below Figure).

(1GR-FE) (2TR-FE)



Energy source of the Accelerator Pedal Assembly

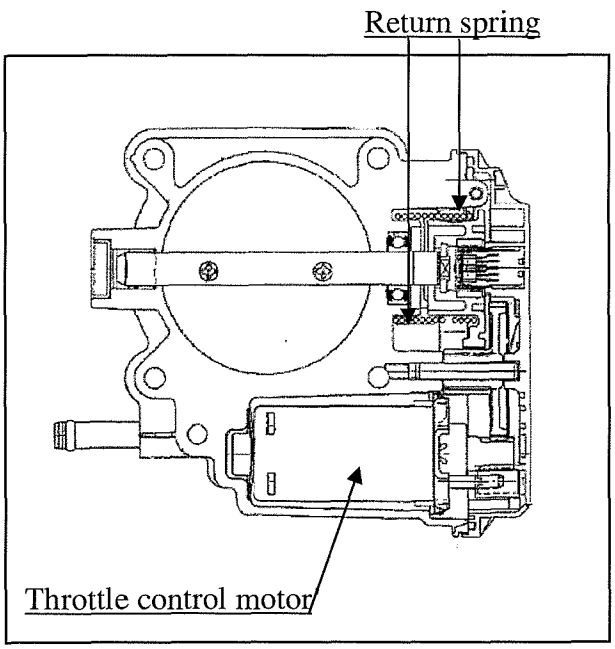
The Accelerator pedal assembly has 2 sources of energy capable of returning the throttle to the idle position (i.e.; 2 compression coil springs). The details are shown in the figure below.



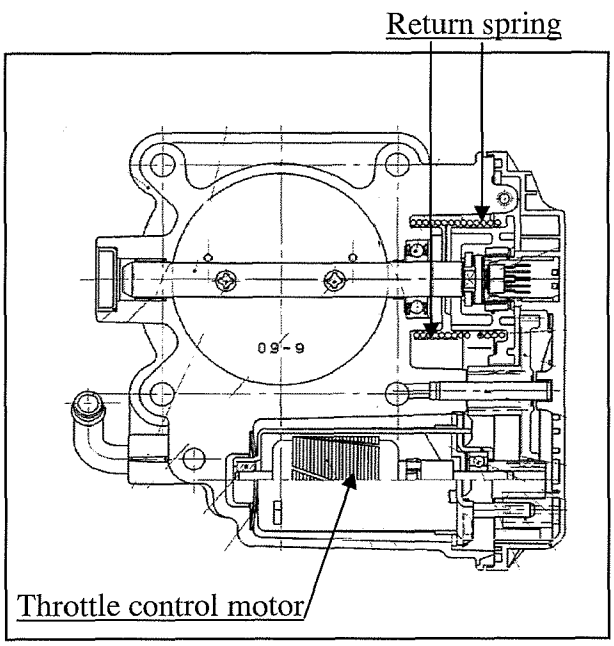
Energy source of the Throttle Body Assembly

The throttle body assembly has 2 sources of energy capable of returning the throttle to the idle position (i.e. The throttle return spring and the throttle control motor). The details are shown in the figure below.

(1GR-FE)



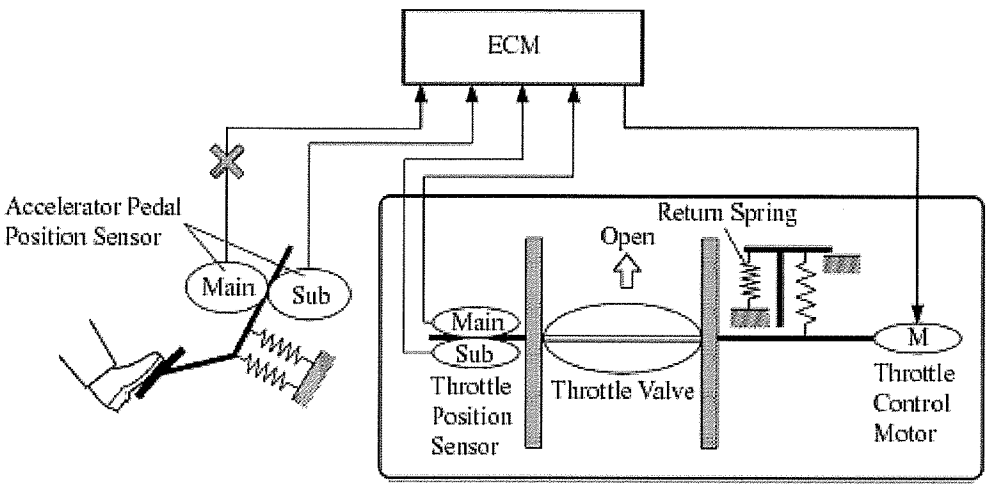
(2TR-FE)



Fail-safe of the Accelerator Pedal Position Sensor

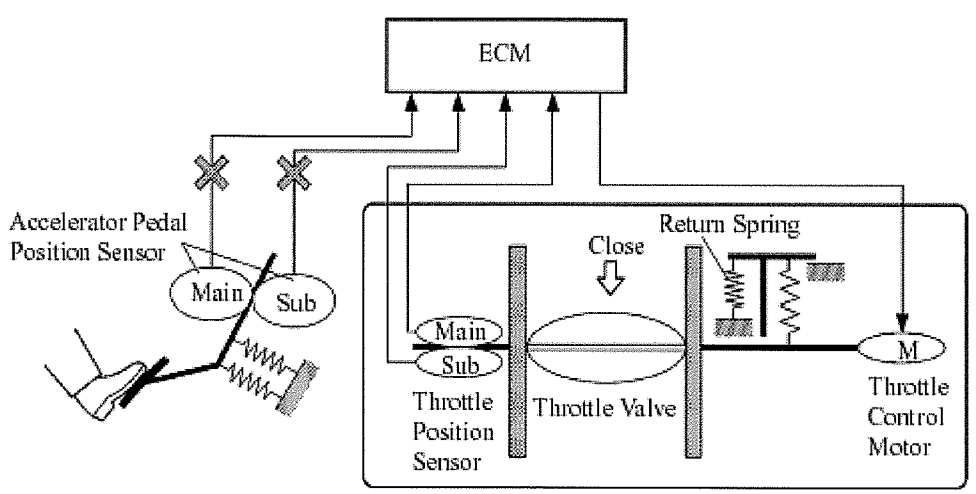
The accelerator pedal position sensor is comprised of two (Main, Sub) sensor circuits.

- If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuits and switches to the limp mode. In the limp mode, the remaining circuit is used to calculate the accelerator pedal opening, in order to operate the vehicle under limp mode control.



Throttle Body

- If both circuits malfunction, the ECM detects the abnormal signal voltage from these two sensor circuits and discontinues the throttle control. At this time, the vehicle can be driven within its idling range.

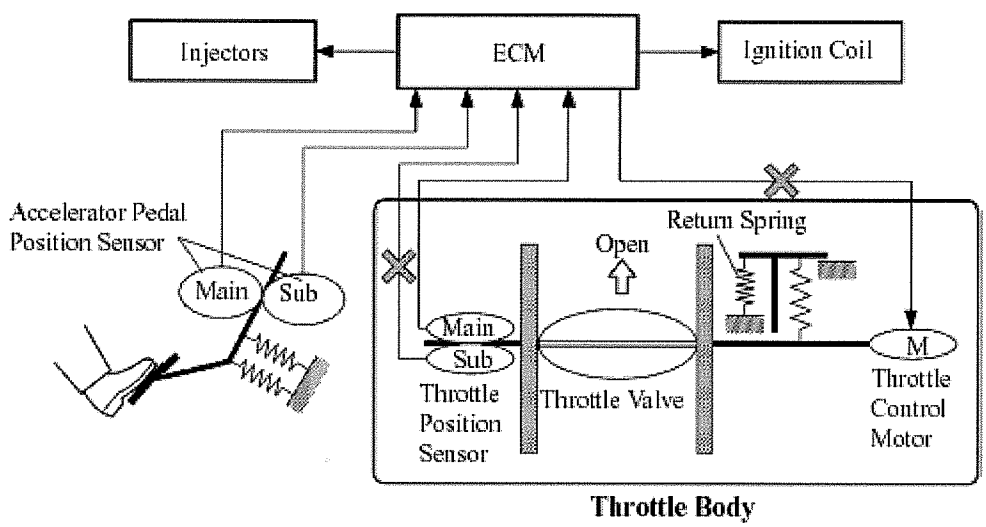


Throttle Body

Fail-safe of the Throttle Position Sensor

The throttle position sensor is comprised of two (Main, Sub) sensor circuits.

- If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuits, cuts off the current to the throttle control motor, and switches into the limp mode.
- Then, the force of the return spring causes the throttle valve to return and stay at the prescribed opening. At this time, the vehicle can be driven in limp mode while the engine output is regulated through the control of the fuel injection and ignition timing in accordance with the accelerator opening.
- The same control as above is effected if the ECM detects a malfunction in the throttle control motor system.

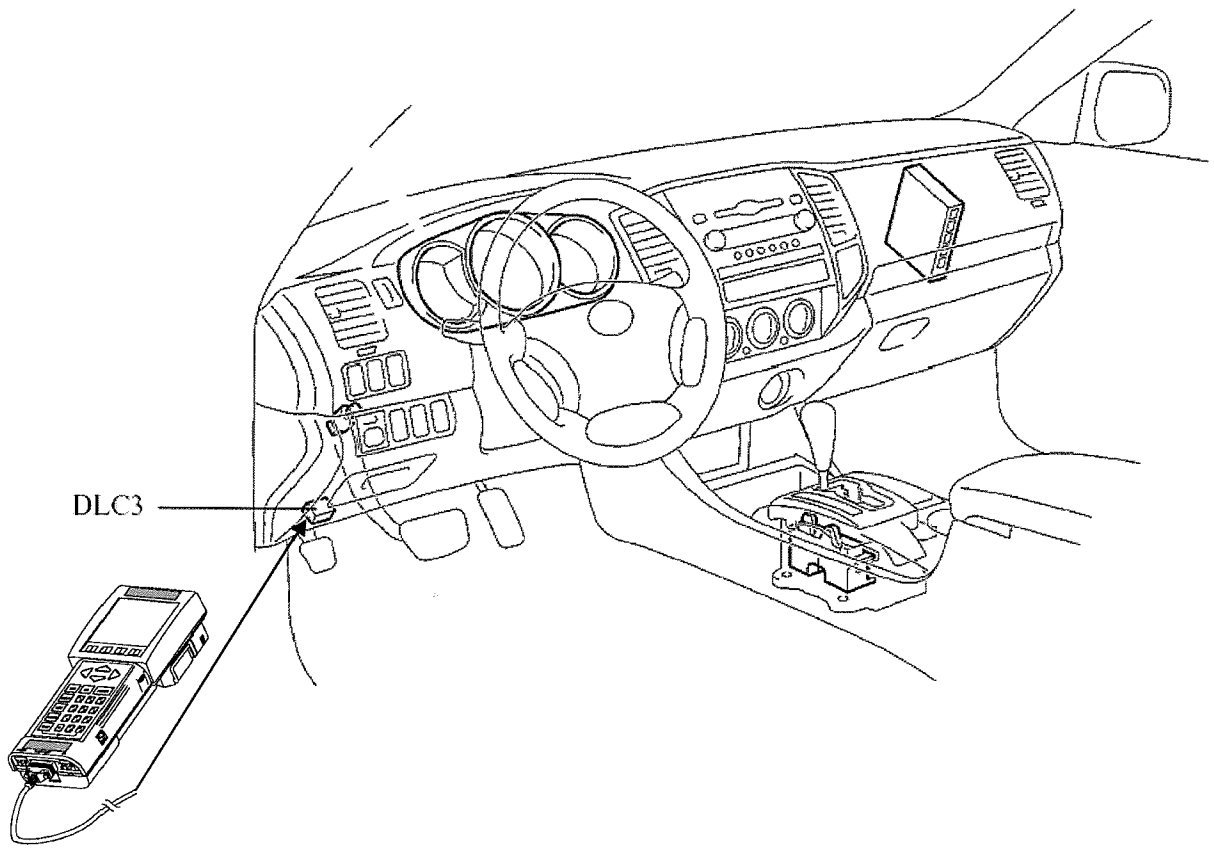


Throttle Body

D13N10

Instructions Regarding Engine RPM Recording

Equipment: Diagnostic Tester (Part number 0200-2309)
Procedure:
(1) Connect the diagnostic tester to the DLC3 (Date Link Connector 3 (i.e.; ODB II connector)).
(2) Start engine.
(3) Check the engine speed status on the tester screen.



Diagnostic tester